

PAPER TO BE PRESENTED TO THE 44th IAF CONGRESS
Graz, Austria
16-22 October 1993

TITLE OF THE PAPER:

Bubble dynamics and coalescence in 1 G and in microgravity

AUTHORS and CO-AUTHORS

L.H. Trinh and J.L. Marston
Jet Propulsion Laboratory
California Institute of Technology
and
Washington State University

DESCRIPTION:

The dynamics of single large bubbles on the order of 1 cm in diameter have been investigated using a novel ultrasonic trapping technique developed for both Earth-based as well as microgravity experiments. Macroscopic bubble shape oscillations have been excited in a controlled manner to measure the natural frequencies of the first four modes, and enhancement of the dissolution rate of oscillating bubbles has been quantitatively determined in 1G on distorted non-spherical bubbles. The same technique and apparatus have been modified in order to carry out a microgravity experiment in the Glovebox facility during the S-I S-50 mission. The goals of the investigation were to study the oscillatory dynamics of an undistorted bubble, to demonstrate the capability of ultrasound for bubble agglomeration in microgravity, to observe bubble coalescence, and to observe the effects of the addition of a surfactant. Results of both ground-based and microgravity experiments will be presented, and the implications of the reduction of the gravitational level will be specifically addressed.